

Welcome to Advanced OS



Today

- Course introduction
- Project startup

Next time

- OS Structure and Design

Basics

- Instructor: Fabián E. Bustamante
- Communication channels
 - Course webpage – all you need to know
~fabianb/classes/eecs-443-w09.html
 - Email for other questions (*please use “EECS443” in subject*)



Course model

- About 10 topics ranging from OS design to botnets
- One paper per meeting (2/week)
- Background & paper discussion per topic
 - Background – I'll provide a brief introduction
 - Paper presentation – One of you will present a paper (15%)
 - Paper discussion – We'll all discuss it (Summaries & participation 15%)
- Projects (40%)
 - I will post some ideas
 - In-class project discussion
- Take-home exam (30%)



Paper presentation

- Keep in mind
 - A presentation is a performance, carefully planned & rehearsed
 - You are the main advocate of the work, act as such
 - Respect your audience – do not waste y/our time with filler
 - Make slides visually pleasant w/o a Madison Avenue look
- Slides will be posted in the course website
(with your name next to it!)
- Audience will provide feedback on
 - Preparation – Understanding of the material, handling of questions ...
 - Presentation material – Level of details, use of examples, slide contents, ...
 - Delivery – Presentation itself, volume, enthusiasm, eye contact, ...



Paper summary

- For every paper – a one-page summary **due by 11:59PM of the previous day**
 - Brief one-line summary
 - A paragraph of the most important ideas.
 - A paragraph of the largest flaws – Being able to assess weaknesses/strengths is an important skill
 - A paragraph stating relevance of the ideas today, potential future research suggested by the article, etc.
- Useful references
 - M. Hanson/D. McNamee, *Efficient reading of papers in Science and Technology*, 1990/2000
 - R. Levin & D. Redell, *An evaluation of the ninth SOSP submissions or How (and how not) to write a good systems paper*, ACM OSR, 17(3), Jul. 1983.



Projects

- Idea
 - Exploratory research project
 - Two-people team
 - Output: workshop-quality report (5 pages)
- Possible topics will be posted
- Deliverables
 - Topic selection and first meeting with me (we can meet before, of course)
 - Project start up document – To be discuss in class
 - Mid-quarter report – For checkpoint and feedback
 - Final paper

Deadline in schedule



Take-home exam

- Open-book (that means web access 😊)
- About five in-depth questions
- I'll be making the following assumptions:
 - You have read all papers listed
 - You have acquired the required background
 - You understand the issues at play
 - You can critically read a paper



Outline

- Topic selection *Jan 12 (2nd week)*
- Startup document *Jan 21*
- Midterm report *Feb 4*
- Paper *Mar 16*
- Presentation *Mar 16*



Content in a Startup Document

- Successful projects start with clearly stated goals
- To ensure this – Project Startup Document
 - Following John Wilkes' guidelines for content
- Basic idea: think of the project as a hypothesis-experiment-conclusion chain
- Basic sections
 - Problem statement
 - Proposal
 - Hypothesis
 - Experiments
 - Results



Content in a Startup Document

- Problem statement
 - What's the problem? Why does it matter? Who cares?
- Proposal
 - What is the basic approach, method, idea or tool being suggested to solve it?
- Hypotheses
 - Expected effects of the proposed solution? Why?
 - Plausible alternatives & how likely are they?
 - What's good/bad about them by comparison?
 - What have others done already? What did they learn?



Content in a Startup Document

- Experiments
 - What will be done to test out the hypotheses?
 - How will this confirm/deny it?
 - Why will the conclusion be believable?
- Results
 - What will be the outcome of the work?
 - When? Intermediate milestones?
 - How will we know when they are complete?
 - What are the measures for success?



Writing a good systems paper* – Criteria

- Original ideas
 - Are the ideas new? Not just a “implementation”
 - Can you state them concisely? Write each down in a paragraph; use that in the abstract
 - How do you know is new? Related work!
 - What is the problem being solved? Why previous approaches do not work? Is the proposed work significantly different?
 - Look at oldest/newest work referenced & types for problems
- Reality
 - Does the paper describe something actually implemented?
 - If so, has it been used and what have you learned?
 - Else, do the ideas justify publication now?

* R. Levin and D. Redell, *An evaluation of the ninth SOSP submissions or How (and how not) to write a good systems paper*, ACM OSR, 17(3), Jul. 1983.



Writing a good systems paper – Criteria

- Lessons

- What have you learned from the work?
- What should the reader learn from the paper? Spell it out
- How generally applicable are these lessons? When stating your conclusions, state the assumptions again.

- Choices

- What were the alternatives considered at various points, and why were the choices made the way they were? *A good paper doesn't just describe, it explains.*
- Did the choices turn out to be right? and, if so, was it for the reasons that motivated them in the first place? If not, what lessons have you learned from the experience?



Writing a good systems paper – Criteria

- Context

- State assumptions; are they realistic?
- How sensitive is the work to their permutations?
- If a formal model is presented, does it give new information & insights? A model for its own sake is not very useful

- Focus

- Avoid extra description not key to your main development
 - Don't describe every aspect of your system at the same level
- Include just enough material from previous work to enable your reader to follow your thread of argument
 - Don't assume reader has read every referenced paper and has them at hand for instant reference
 - But don't burden them with unnecessarily lengthy abstracts from cited works



Writing a good systems paper – Criteria

- Presentation

- Ideas organized & presented in a clear & logical way
- Terms defined before they are used, few forward references
- Have alternate organizations been considered?
- Was an abstract written first? Does it communicate the ideas?
 - Avoid passive voice
 - Include a simple statement of assumptions & results
 - Leave discussion & argument for the paper
 - **Write abstract & outline before the paper**



Writing a good systems paper – Criteria

- Writing style
 - Clear and concise
 - Check spelling, use of words, grammar
 - Avoid ambiguity, slang and cuteness
 - ***Remember you are asking a favor from reviewers: “Please let me convince you that I have done interesting, publishable work.”***



Next time

- OS Design, Structure and Extensibility
 - Paper: D.R. Engler et al., *Exokernel: An Operating System Architecture for Application-Level Resource Management*, In Proc. of SOSR, Dec. 1995.
 - Presenter: Fabián

